

# Scientific Method Notes:

## The Scientific Method



1. Ask a Question



2. Research your Topic



3. State your Hypothesis



4. Test your Hypothesis



5. Analyze your Data



6. Report your Results

## Steps of the Scientific Method

**Ask a Question:** The scientific method starts when you ask a question about something that you observe: How, What, When, Who, Which, Why, or Where?

And, in order for the scientific method to answer the question it must be about something that you can measure, preferably with a number.

**Do Background Research:** Rather than starting from scratch in putting together a plan for answering your question, you want to be a savvy scientist using library and Internet research to help you find the best way to do things and insure that you don't repeat mistakes from the past.

**Construct a Hypothesis:** A hypothesis is an educated guess about how things work:

"If \_\_\_\_\_ *[I do this]* \_\_\_\_\_, then \_\_\_\_\_ *[this]* \_\_\_\_\_ will happen."

You must state your hypothesis in a way that you can easily measure, and of course, your hypothesis should be constructed in a way to help you answer your original question.

**Test Your Hypothesis by Doing an Experiment:** Your experiment tests whether your hypothesis is supported or not. It is important for your experiment to be a fair test. You conduct a fair test by making sure that you change only one factor at a time while keeping all other conditions the same. You should also repeat your experiments several times to make sure that the first results weren't just an accident.

**Analyze Your Data and Draw a Conclusion:** Once your experiment is complete, you collect your measurements and analyze them to see if they support your hypothesis or not.

Scientists often find that their hypothesis was not supported, and in such cases they will construct a new hypothesis based on the information they learned during their experiment. This starts the entire process of the scientific method over again. Even if they find that their hypothesis was supported, they may want to test it again in a new way.

**Communicate Your Results:** To complete your science fair project you will communicate your results to others in a final report and/or a display board. Professional scientists do almost exactly the same thing by publishing their final report in a scientific journal or by presenting their results on a poster at a scientific meeting. In a science fair, judges are interested in your findings regardless of whether or not they support your original hypothesis.